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ABSTRACT

In response to the challenge of media technology and classroom cultural and educational diversity, this paper (1) presents a brief overview of historical literature on the suggestive powers of visual images in business and education, (2) analyzes the influence of audience diversity and biases during the production/selection of visual presentations, and (3) considers the delimiting form of new media presentations. Pedagogical and technological concerns have grown since the emergence of visually enhanced learning environments in the allied fields of business and education. Newly formed businesses which specialize in the creation of computer-generated and controlled images are examples of profitable and growing new media companies, which provide production, training, and consultation for their clients. Production and training, and cost-effectiveness are concerns for educational institutions as sophisticated electronic tools are implemented in classrooms. The advantages of using new technology for creation and display of visual images include easy manipulation to fit the customized needs of the user and saved production time and energy. In contrast, research suggests that images are also able to detract from learning, so new media productions can prove detrimental without proper training in design principles and awareness of related issues. Media producers can obtain positive results not only by skill but also by sensitivity to such issues as adverse reflection, equal reflection, along with awareness of target audience's cultural background, gender, and ethnic biases. (Contains 16 references.) (MAS)

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The Impact of Electronic Visualization: Concerns and Delimitations

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Old testament proverbs, children's well-loved bedtime stories, and *The Wall Street Journal* hold several things in common–strange news, hard to explain happenings, and visual images which can perturb or perplex the reader. Graphical images can, additionally, influence, teach, inform, motivate, persuade, and captivate audiences.

In telling our human stories, we practice the science and art of blending illustration and words for audience impact. The desire for particular audience reactions and results has led to a growing interest in a specialized mixture of classroom pedagogy, computers, along with oral and visual communication theories and practices during presentations.

Background

Visual presentations generated and controlled by computers pattern traditional media presentations in several ways. Both seek to produce and incorporate visual information for their audiences; both require time, investments, skills, and competencies.

In contrast to traditional media, computer-generated presentations have extended abilities. Computers incorporate and manipulate video, photography, audio, special sound effects, animation, line art, gray-scale images, color photos, and text.

Moreover, new media production can receive and control input from devices including telephones, satellites, compact and laser disks, electronic pens, touch screens, high and low resolution scanners, and even "smart agents" (Allen, 1994) which permit multinodal entry of data. Thus, pedagogical and technological concerns have enlarged since the emergence of these visually enhanced learning environments in the allied fields of education and business.

Business

Newly formed businesses which specialize in the creation of images generated and controlled by computers such as Graphix Zone in Santa Ana, California and New Horizon Computer Learning Center located in Irvine, California, are examples of profitable and growing

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new media companies–one in training and one in commercial productions. They provide production, training, and consultation for their clients. Both companies rely on the continued growth and viable applications of new media presentations.

Education

Production and training issues also hold true for our educational institutions as implementation of the current sophisticated electronic tools in our classrooms take hold. Like new media production companies, administrators face similar problems in instituting change in the classroom. Incorporating change in the classroom involves budget, instruction, and training issues.

All teachers eventually face the challenge of incorporating to some degree the new media communications channels for use in their classroom environment. However, not all teachers would become multimedia producers. In addition to time and budget, visualization utilizing new media technology requires the continuing recognition of the many, often opposing issues of culture, class, ethnic background, along with the individualized learning styles of which all audiences are composed.

Au (1993) defines the culture found in the classroom to include the ethnic biases of instructor and learner, in addition to class or socio-economic status and their learning language preference. This definition places the issue of cultural and educational diversity as an important concern and challenge to all in the mainstream classroom environment:

> Population trends make it clear that the schooling of students of diverse backgrounds cannot be seen as an issue to be addressed through special remedial programs

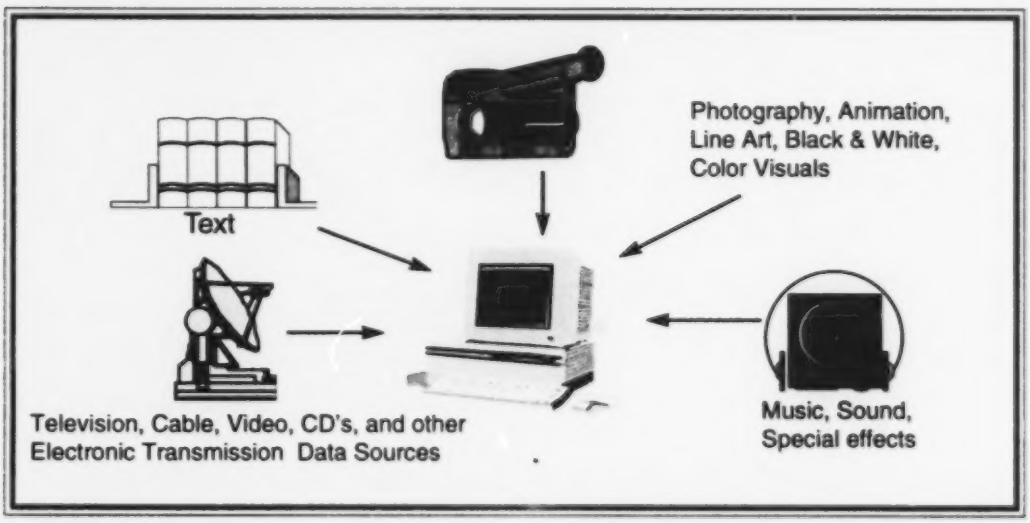

figure 1. Elements of a Computer-Controlled Multimedia Presentation

> that target just a small number of students in each school. Instead, we will need to make major changes in the approaches we use in the regular classroom and throughout the school system as a whole. (p. 3)

Focus of Challenge

In response to this challenge, this paper will: (1) present a brief overview of historical literature on the suggestive powers of visual images in business and education, (2) analyze the influence of audience diversity and biases during the production/selection of visual presentations, (3) consider the delimiting form of new media presentations.

Literature Review

Past research suggests that visual images have the ability to influence the viewers' emotional and physiological responses. Ability, according to *The World Book Dictionary*, emphasizes an inborn talent or existing skill. Its definition reads "the power to do or act . . . the power to do something special."

Graphical images affect how we see and understand ourselves and how we see, understand, and uniquely relate to the environment. Research suggests that images processed by the brain muscle can be internally and/or externally stimulated as proposed by Renate and Geoffrey Caine (1991) in their book titled *Making Connections Teaching and the Human Brain*. In addition, Hodes (1990) found that imagery was a "prominent cognitive process for the retention of information in all learning situations" (p.3). Hodes summarizes mental and visual images as having the ability to act as: (1) facilitator, (2) mediator, and (3) historian. She suggests that images may provide the necessary link between a novice learner and successful completion of a new task.

Visual communicators have historically understood the power of the image to motivate the viewer. However, only in the last decade has research results suggested that visuals themselves are highly biased in their very nature. For example, Berger (1989) writes:

> The first thing we must recognize is that we don't just "see" but have to learn how to see and what to see . . . . and what we decide to see is determined by what we know and what we believe and what we want. (p. 25)

Thus, culture plays a major role in the creation, understanding, and interpretation of visual images for business and education. Houghton and Willows (1987) found that:

> Presenting a picture of an unfamiliar object or animal to a child in a pictorially oriented culture can be educational; but in a context such as an agricultural extension scheme,

> familiarity with the depicted object is basic to understanding. (p. 59)

Effective images are useful in the learning environment because they act as signals to the learner. The learner utilizes effective visuals as clues and cues in the classroom during the learning process. Research suggests that training which includes visualization of material content provides "... significant improvement in teachers' clarity and ability to produce student learning" (Metcalf and Cruickshank, 1991).

Audience Diversity

One picture can hold thousands of individualized interpretations. Current research suggests that a broader awareness of the differences and biases in personalized image-meaning is extremely valuable for multimedia presenters (Au, 1993; Gollnick & Chinn, 1994).

Further research shows television provides major contributions to the bank of visual information available to the masses (Biagi, 1990). For example, studies in the field television suggest that stereotypical images influenced a frequent viewers social understandings more than non-frequent viewer according to Liebert and Sprafkin (1988).

Findings on televised images and the influence on viewers suggest that "individuals who would not otherwise hold the mainstream view but watch a lot of television will be influenced over time, in the direction of moving toward the mainstream" (p. 193).

Moreover, Liebert and Sprafkin after reviewing the work of Huesmann and his associates (1986) found that televised images showed ". . . a clear and significant relationship between exposure to TV violence at age 8 and the seriousness of criminal acts performed by these individuals 22 years later, at age 30." Thus, electronic televised images affect viewers of all ages.

With new media technology, televisions and computers now have the ability to share those same images. In addition, computers, through simulations, allow users access to an environment that models real and imaginary microworlds (Rieber, 1994).

Past research suggests that visuals in computer simulations can also have a positive impact and enhance instruction and the learning process. However, additional findings indicate that visuals can have no effect or may even detract from the learning experience for the user.

Over the years, a wide array of literature has proven the effectiveness of using visuals in presentations. Today's technology takes us even further by opening new avenues and applications. Past

research provides a foundation for encouraging graphical images in learning environments. Current research is concerned with how new media images are selected, manipulated, and applied for improved effectiveness and enhancement of learning.

Creation Methods

Although the image-making process is recorded as far back as the pictograph painted on the stone walls of early man, images for institutionalized educational purposes in the United Sates appeared only in the past 300 hundred years (Diringer, 1982). Methods of creating and incorporating visual images into presentations oftentimes required the mastery of various skilled visual artists.

The first illustrated text used for educational purposes in early colonial times included black and white drawings and an illustrated alphabet intended to instruct the young learners of the time. These images were created using the available materials such as plant dyes, inks, and other nature-supplied media.

In contrast, today's electronic image–making and recording consists of positive and negative electron charges recorded in a cathode ray tube. New image rendering software enters the market every month touting better, faster, easier ways to render 2 dimensional and 3 dimensional static and animated text and objects.

Users and creators of visual graphics are no longer bound by traditional methods and labor intensive work. Instead, computer software easily permits electronic manipulation of photographs along with page layouts to users after a short instructional introduction. Illustration programs offer enhancement techniques practiced by skilled artisans and trained specialists.

Computers provide a quick and easy way to produce high quality visuals for business and educational uses. However, new technology holds both advantages and disadvantages.

Advantages

The application for computer-generated images are many and diverse. Electronic images are easily manipulated thus fitting the customized needs of the user. For example one multi-platform software presentation program, PowerPoint, produced by Microsoft Corporation for use in business and education, offers many advantages for both the occasional and advanced presenters.

PowerPoint provides the ability to the multimedia producer of presenting in various modes--black and white, gray-scale, as well as

access to a full range 16.7 million colors. In contrast to the traditional methods which utilize pen, paper, and available inks to display information, electronic presentation programs can also prove cost effective in the long run since the presenter often takes on the various production roles. The presenter may adopt the roles of producer, writer, artist, and editor thus maintaining complete control instead of hiring out, thus, cutting expenses.

Other advantages of using new technology for creation and display of visual images include saving production time and energy. Presentation programs frequently provide pre-produced clipart and access to hundreds of images included on compact discs.

CD's containing clipart files are, even for first time users, easily accessed, often with a few clicks of the mouse. If no pre-packaged art is included, drawing tools such as lines, squares, circles, elliptical and specialized shapes and color fills are available along with an assortment of patterns, fills, and gradients to add the necessary elements of visual variety and interest.

Disadvantages

In contrast, new media productions can however prove visually disastrous. As research suggests images are able to (1) enhance, (2) have no effect, or (3) detract from learning. Thus, without the proper training in design principles and awareness of related issues from other fields such as education, new media technology, and visual literacy, computer presentations may have no effect or worse yet harm the viewer's learning experience.

Instruction and training in design principles is essential even for advanced computer users who are now entering the field of visual graphic display and who themselves are motivated by the emotional appeal of images created by current advertising.

Summary

In Hollywood, a good picture holds the power to weave a story, capture the audiences' attention, and provide specific results. The same holds true for today's electronic learning environments utilizing new media production tools and devices. Well-designed images lead, along with practice and the development of production skills, to presentations which generate audience interest and participation, and an enriched learning experience.

High-impact and persuasive images make a difference in the learning environment. As is the case with traditional media presentations, the use of well chosen and placed visual illustrations in multimedia presentations can lead to better productivity and increased effectiveness in the classroom as

well as the meeting room (Kupsh & Graves, 1993).

Balance, proportion, unity, and symmetry continue as earmarks of pleasing visual design. Both past and present research also suggest that visual images whether mentally or visually stimulated can lead to an enhanced learning experience particularly for the novice learner when a hands-on learning environment is not available.

What we *see* with our mind is known to be more complex than what we see with our optical sensor, the eye. Research suggests that graphical images can affect the viewer in several ways--positive, negative, and ineffectual. For new media producers, positive results are obtained not only by skill but by sensitivity to such issues as adverse reflection, equal portrayal, along with awareness of target audience's cultural background, gender, and ethnic biases. These issues become major considerations when selecting and designing images for inclusion in computer-controlled new media presentations.

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